Comet Gale (*b* 1894). By H. C. Russell, B.A., F.R.S.

The discovery of this comet was announced on April 4. On the 5th and other following days we obtained satisfactory observations of position, which are given below. The star camera has also been applied to the investigation of the comet's form, and has brought to light some remarkable changes. On April 5, with one hour's exposure, the comet is shown with well-marked central condensation, and a diameter of coma of 3′ and a very faint tail showing double; that is, as if two faint rays extended from the comet about 10′. From the 5th to the 23rd, bad weather and moonlight stopped the photographs; on the 23rd the photograph shows a very similar tail, with two rays, forming its bounding lines, extended for 20′, coma 6′ in diameter. On the 24th clouds limited the exposure to 55^m; central condensation decided, diameter of coma $7\frac{1}{2}'$, and well-marked long narrow tail 2′ across, more like Winnecke's comet 1868 than anything else I have seen. This long narrow tail was easily seen with the large equatorial, and traced 2°. In the photograph it extends to the edge of the plate $1\frac{1}{4}°$. Upon careful examination it appeared that at $\frac{3}{4}°$ from the comet the tail forked, but this feature is so faint that I cannot be sure of it.

On the 25th passing clouds and some haze interfered, but an exposure of $1^h\ 44^m$ was obtained, showing the coma 9′ in diameter, and a tail exactly similar to that on the 23rd, only much better defined and longer, extending $\frac{3}{4}°$, and the two bars evidently the bounding lines of the tail, much of which is very faint, and only visible with a suitable light. With the equatorial the tail was exceedingly faint, and only visible for 7^m or 8^m, although the comet was very distinct and the central condensation very marked, and apparently elongated in R.A. On the 26th we had another night of passing clouds, but a clear exposure of $1^h\ 16^m$ was obtained; the diameter of coma is 10′, the tail is neither single nor double, but is broad, diffused, and fan-shaped. With the equatorial no tail could be seen. On the 27th we had a fine clear night, and exposed the plate for three hours.* The coma in this photograph is 25′ in diameter, and the tail is again single, almost an exact counterpart of what it was on the 24th, except that it is slightly wider (3′); it extends to the edge of the plate $1\frac{1}{4}°$. With the equatorial it was easily seen and traced 2°, and was noted to be very similar to what it was on the 24th.

On the 28th it was cloudy, and on the 29th it was partially fine again, and an exposure of two hours was obtained between

* Mr. Russell sent with the paper silver prints of the photographs taken on April 25 and 27, which are in the library of the Society.

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passing clouds, in this the coma is 15′ in diameter, and there is no defined tail, only a very faint and diffused something, visible with specially arranged illumination. With the equatorial nothing could be seen of it. The weather has been bad, and I should not have published these results, obtained under difficulty, but that I am quite convinced of the change from a wide or apparently double tail to a narrow one, as seen on the 24th and 27th, and the reverse on the 29th. The photographs seem to prove this beyond doubt, for on the 24th we have an exposure of 55^m, showing a decided long narrow tail and coma $7\frac{1}{2}'$ in diameter; while on the 25th, with an exposure of $1^h\,44^m$, showing the coma 9′ in diameter, or much larger than it was shown by the photograph of the 24th; and yet the tail is distinctly double and unlike what it was on the 24th, and this result is confirmed by independent observations with the equatorial. The repetition of the long narrow tail on the 27th, both photographically and visually, is also beyond doubt; and the photograph of the 30th, with coma 15′ in diameter, shows a much more effective exposure than that of the 24th, with coma only half that diameter; yet the narrow defined tail is missing both in telescope and photograph.

Observations of Comet Gale made with the 11½-inch Refractor of Sydney Observatory.

1894.	Syd. M. T.	Δ R.A.	Δ N.P.D.	Cp.	App. R.A.	Log p. Δ	App. N.P.D.	Log p. Δ	Red. ad l. app.	*	Observer.
	h m s	m s	′ ″		h m s		° ′ ″		s ″		
Apr. 5	7 59 17	− 2 15·31	−6 11·8	9	2 42 22·44	9·938	145 36 22·7	0·488	−1·00 +1·7	1	R. P. Sellors.
5	8 42 39	− 4 11·16	+1 57·8	8	2 42 34·62	9·926	145 36 17·8	0·624	−0·99 +1·8	2	,,
5	8 56 6	− 5 34·96	+5 36·2	4	2 42 37·99	9·919	145 36 17·9	0·658	−1·00 +1·8	3	,,
12	8 15 0	+ 4 47·20	+5 49·1	5	3 36 41·84	9·929	144 46 26·5	0·455	−1·06 +1·8	4	H. C. Russell.
12	8 49 1	− 4 38·23	−2 49·1	5	3 36 55·63	9·924	144 46 4·5	0·572	−1·06 +2·2	5	R. P. Sellors.
12	9 27 48	− 4 39·62	+9 1·5	4	3 37 11·04	9·907	144 45 33·4	0·673	−1·05 +2·3	6	,,
16	9 11 8	−12 36·20	−1 9·8	2	4 19 48·30	9·906	142 54 42·2	0·570	−1·01 +3·8	7	,,
17	7 36 27	− 3 59·70	−2 50·3	7	4 31 8·06	9·881	142 13 6·5	0·074	−1·00 +3·7	8	,,
20	7 57 15	+ 4 35·92	−7 30·4	5	5 11 0·82	9·847	138 59 19·1	0·121	−0·87 +4·6	9	,,
23	8 36 9	+ 4 31·66	+6 54·1	6	5 54 47·44	9·809	133 41 40·0	0·292	−0·65 +6·0	10	,,
23	9 8 59	+ 0 29·90	+1 49·4	6	5 55 7·86	9·824	133 38 37·3	0·425	−0·63 +6·2	11	,,
24	8 0 47	− 4 6·74	−3 21·8	7	6 9 18·36	9·754	131 26 20·6	0·101	−0·52 +6·8	12	,,
25	7 55 17	+ 1 50·60	−2 38·8	6	6 24 8·11	9·718	128 49 55·1	0·098	−0·45 +6·8	13	,,
26	7 57 51	+ 2 13·73	−8 38·7	5	6 38 57·68	9·690	125 53 36·2	0·159	−0·33 +6·9	14	,,
27	7 37 40	+ 2 35·00	+2 25·5	10	6 53 20·30	9·626	122 41 55·4	0·142	−0·23 +6·9	15	,,
27	8 12 35	− 1 21·26	+2 6·3	10	6 53 41·29	9·679	122 36 50·6	0·270	−0·20 +7·1	16	,,